

Service Manual

ATEC[®] Breast Biopsy and Excision System Stereotactic Adapter



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SECTION 1: INTRODUCTION

1.1 Scope of Manual

This manual is written for medical technicians who will be responsible for maintaining the Suros ATEC Breast Biopsy and Excision System Stereotactic Adapter. It is extremely important that the technician read and thoroughly understand the contents of this manual and follows the instructions contained herein.

1.2 Warranty Policy

All capital equipment purchased includes a 1-year warranty and after-business hours pager support at (800) 780-9303.

- **Under Warranty/Extended Service Plan** – Time and material for repair, preventive maintenance and upgrades, as well as shipping costs for returned capital equipment are the responsibility of **Suros**.
- **Out of Warranty** – Time and material for repair, preventive maintenance and upgrades, as well as shipping costs for returned capital equipment are the responsibility of the **Customer**.

A Suros representative will contact the customer with an estimated cost of the repair and quote an Extended Service Protection Plan prior to any repairs being conducted or completed on out of warranty equipment.

1.3 Extended Service

Customers are requested to contact the Suros Customer Service Department or a Sales Representative for the purchase of an Extended Service Protection Plan.

1.4 Assistance

Suros seeks to provide technical assistance as efficiently and effectively as possible. Please contact Suros Customer Service at 877-887-8767 if assistance is needed.

1.5 Training

Suros has developed a Biomedical Training Course to teach the content of this manual. The course includes “hands-on” demonstrations of basic maintenance, service and trouble-shooting.

1.6 Warnings and Cautions

Please read all contents of the Service Manual for your ATEC Breast Biopsy and Excision System Stereotactic Adapter prior to servicing.

Warnings

- The ATEC Stereotactic Adapter may become contaminated with bodily fluids through normal use. Please refer to your facility's guidelines and policies on handling contaminated equipment.
- Use of improper cleaning agents may damage the anodized coating of the ATEC Stereotactic Adapter. To prevent such damage, always clean adapter with cleansing agents and protocols that meet criteria recommended by Suros on p.9 of this manual.

- All contaminated cleaning agents should be disposed of in accordance with state and federal requirements.

Cautions

- Service of the ATEC Stereotactic Adapter should only be accomplished by Suros trained personnel.
- Use only disposables with this system that are manufactured by Suros. Use of any other systems' disposables may result in system damage and will void manufacturer's warranty.

SECTION 2: PRODUCT DESCRIPTION

2.1 Theory of Operation

The ATEC Stereotactic Adapter is used to properly position the ATEC Breast Biopsy and Excision System (“ATEC system”) biopsy needle during stereotactic biopsy procedures utilizing the following adapter functions:

1. The clamp (STX-1 & STX-Fischer) or slide (STX-2 & STX-2F) of the ATEC Stereotactic Adapter secures the ATEC system biopsy needle to the adapter.
2. The index hub locks secure the ATEC system breast biopsy needles hub and outer cannula during marker deployment.
3. The cocking lever engages the adapter to the pre-fire position.
4. The release bar allows adapter to fire the ATEC system biopsy needle into position after tissue has been targeted.
5. The ATEC STX-Fischer adapter utilizes a Fischer bracket to secure and position a STX-1 adapter on the Fischer guide rail.
6. The ATEC STX-2F adapter utilizes a Fischer bracket to secure and position a STX-2F adapter on the Fischer guide rail.
7. The ATEC STX-Fischer adapter utilizes the Fischer needle guide holder to properly position the ATEC system breast biopsy needle. The needle guide holder assembly attaches to the guide rail separately from the adapter.

2.2 Adapter Configurations

There are four configurations of the ATEC Stereotactic Adapter. Each is designed to allow proper function with different stereotactic table designs.

2.2.1 ATEC STX-1

The ATEC STX-1 adapter is designed and intended for use with Lorad prone tables. The adapter attaches to the table via a threaded insert in the base assembly.



Figure 2.2.1 ATEC STX-1 Adapter

2.2.2 ATEC STX-2

The ATEC STX-2 adapter uses a sliding clamp that goes over the top of the ATEC system breast biopsy needle, firmly securing it to the cradle. The adapter attaches to the table via a threaded insert in the base assembly. This configuration is intended for use with Lorad, GE, Instrumentarium, and Siemens upright imaging systems.



Figure 2.2.2 ATEC STX-2 Adapter

2.2.3 ATEC STX-Fischer and Fischer Needle Guide Holder

The ATEC STX-Fischer adapter uses an auxiliary bracket assembly that allows the adapter to be secured to the Fischer guide rail. The STX-Fischer adapter utilizes the STX-1 base adapter. The Fischer needle guide holder, used in conjunction with the STX-Fischer adapter, is secured to the Fischer guide rail allowing proper positioning of the ATEC system breast biopsy needle.



Figure 2.2.3 ATEC STX-Fischer Adapter and Needle Guide Holder

2.2.4 ATEC STX-2F and Fischer Needle Guide Holder

The ATEC STX-2F adapter uses an auxiliary bracket assembly that allows the adapter to be secured to the Fischer guide rail. The STX-2F adapter utilizes the STX-2 base adapter. The Fischer needle guide holder, used in conjunction with the STX-2F adapter, is secured to the Fischer guide rail allowing proper positioning of the ATEC system breast biopsy needle.



Figure 2.2.4 ATEC STX-Fischer Adapter and Needle Guide Holder

SECTION 3: CLEANING AND PREVENTIVE MAINTENANCE

3.1 General Precautions

The ATEC Stereotactic Adapter is positioned near the body and is likely to become contaminated with bodily fluids during use. Please read and follow all cleaning instructions for safe use and servicing of this equipment.

3.2 Cleaning Instructions

The adapter should be cleaned per post-use guidelines immediately after each use. Cleaning at pre-servicing is more thorough and should be accomplished in accordance with pre-service guidelines.

!! CAUTION !! - Cleaning products with the following agents are **NOT RECOMMENDED** as they may damage the black anodized coating or other exposed components:

1. Bleach based cleaning agents.
2. Hydrogen Peroxide.
3. Any cleaners/disinfectants with a pH of less than 4 or greater than 10.

3.2.1 Post-Use Cleaning

1. Upon completion of each biopsy procedure, immediately rinse with warm water.
2. Spray with cleaning solution such as Precise[®] from Caltech[®] Industries.
3. Allow 10 minutes for cleaning solution to wet surface and disinfect.
4. Rinse with warm water.
5. Dry completely with cloth or paper towel.
6. Repeatedly cycle all moving components to remove any trapped cleaning solution.
7. Repeat cleaning of adapter if any component does not perform properly.

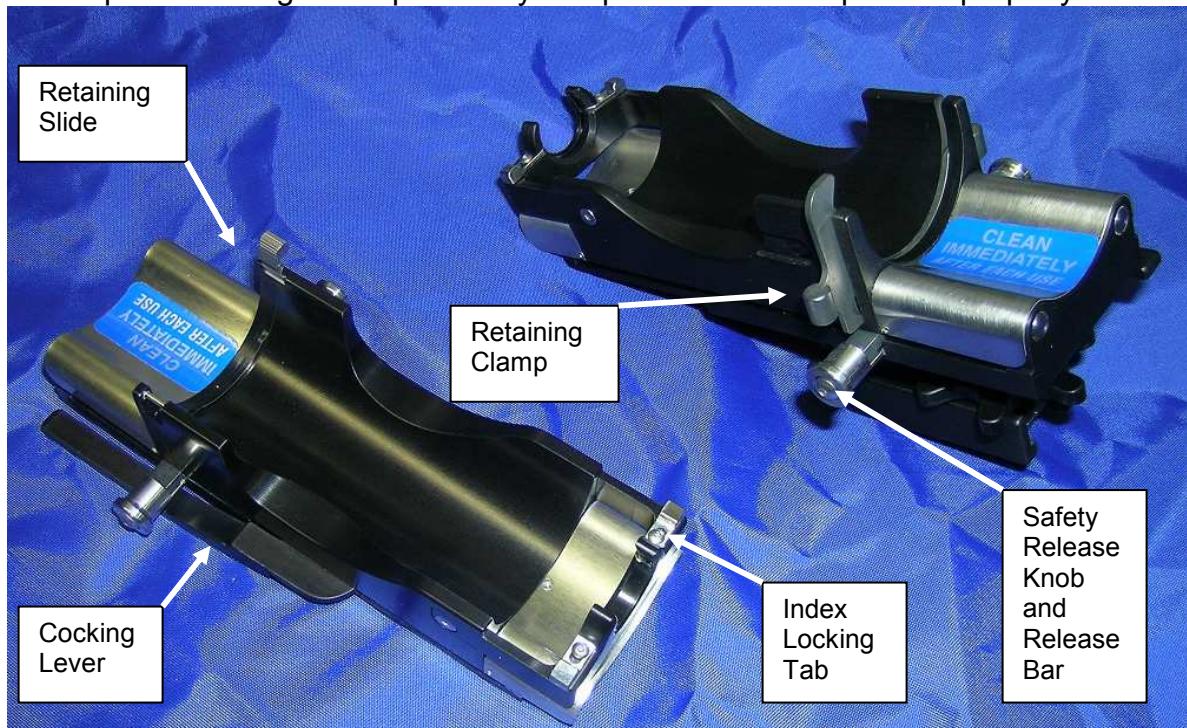


Figure 3.2.1 Stereotactic Adapter Components

3.2.2 Pre-Service Cleaning

1. If cleaning a STX-Fischer or STX-2F adapter, remove Fischer bracket assembly by removing the adapter screw using a 3/16" Allen (Hex) wrench.
2. Completely submerge adapter and any removed components in an instrument decontamination solution such as Amerse[®] 2 from STERIS[®] Corporation.
3. Leave adapter in solution for 15 minutes.
4. Rinse with warm water.
5. Dry completely with a cloth or paper towel.
6. Repeatedly cycle all moving components to remove any trapped cleaning solution; reference Figure 3.2.1 Stereotactic Adapter Components.
7. Repeat cleaning process if necessary and use a soft bristle brush to remove any excessive contaminants.
8. As components are removed from the adapter they may require further cleaning.

3.3 General Inspection

1. The ATEC Stereotactic Adapter should be free of all biological contaminants after accomplishment of cleaning per section 3.2.2 of this manual.
2. The black anodized coating should be bright and smooth to the touch. A dull or rough surface is indication that the adapter is not being cleaned in accordance with recommended instructions.
3. The black anodized coating should be free of scratches and gouges that expose the underlying metallic surface.
4. Inspect for evidence of impact damage from rough handling. Pay particular attention to clamp assembly or handpiece retaining slide, long and short covers, and index locking assembly as they are susceptible to damage if dropped.

3.4 Preventive Maintenance Procedure

Preventive maintenance checks are recommended every 18 months under normal usage. Accomplish preventive maintenance check using the checklist in Appendix 1 and referenced instructions.

SECTION 4: SERVICE

4.1 Required Tools and Materials

1. #0 Phillips Screwdriver
2. Small Slotted Tip Screwdriver
3. 0.035" Allen (Hex) Wrench
4. 0.050" Allen (Hex) Wrench
5. 1/16" Allen (Hex) Wrench
6. 5/64" Allen (Hex) Wrench
7. 1/8" Allen (Hex) Wrench
8. 3/16" Allen (Hex) Wrench
9. 0.019" Pin Gage or Feeler Stock
10. Needle Nose Vise (Locking) Pliers
11. Long Small Diameter Punch
12. Heat Gun
13. LOCTITE[®] 242 Medium Strength Thread Locker or equivalent
14. Permatex[®] Clear RTV Silicone Sealant or equivalent
15. Super Lube[®] PTFE Lubricant or equivalent

4.2 Disassembly

In this section, the complete disassembly of the ATEC Stereotactic Adapter will be covered. The procedure varies based on the adapter configuration. Verify adapter configuration before servicing and use applicable instructions as noted. Neither normal servicing nor preventive maintenance will typically require a complete disassembly of the adapter. It is intended that the proper combination of instructions will be used to complete the servicing of your adapter. The figure numbers listed are for the associated drawings located in Section 5: Drawings and Illustrated Parts List.

4.2.1 Removal and Disassembly of Fischer Bracket (Figure 8)

Adapter Configuration: STX-Fischer & STX-2F

1. Remove Fischer bracket assembly from the adapter base by removing the center adapter screw.
 - a. Use a 3/16" Allen (Hex) wrench.
2. Remove thumbwheel socket set screw while holding the thumbwheel stationary.
 - a. Heat bracket base to loosen threadlocker and allow screw removal.
 - b. Use a 1/8" Allen (Hex) wrench.
3. Slide thumbwheel out of slot in bracket.
4. Slide clamp out of slot in bracket.
5. **DO NOT** remove alignment pins from bracket.

4.2.2 Removal of Long (rear) Cover (Figure 1)

Adapter Configuration: All

1. Remove cleaning label.
2. Remove (3) cover screws.
 - a. Use #0 Phillips screwdriver.
3. Remove cover and clean silicone from cradle and cover contact surfaces.

4.2.3 Removal of Cradle Assembly from Base Assembly (Figure 2)

Adapter Configuration: STX-1 & STX-Fischer

1. Remove long (rear) cover per 4.2.2.
2. Position clamp assembly in the open position.
3. Remove (2) guide rail set screws.
 - a. Position Adapter upside down on work surface.
 - b. Heat set screws to loosen threadlocker and allow screw removal.
 - c. Use a 1/16" Allen (Hex) wrench.
4. One at a time, slide each guide rail forward far enough to remove springs.
5. Slide (2) guide rails forward and remove them from the adapter assembly.
6. With clamp in the open position, pull up to remove from the cradle.
7. Lift cradle sub assembly from adapter base.
8. Remove (2) guide washers.
9. Remove (4) guide O-rings from disassembled adapter.
10. Remove gear rack.

4.2.4 Disassembly of Cradle Sub Assembly (Figures 2 & 5)

Adapter Configuration: STX-1 & STX-Fischer

1. Remove cradle sub assembly per 4.2.3.
2. Remove spring plunger assembly.
 - a. Use needle nose vise grips to turn plunger assembly.
3. Remove (4) Rulon bushings from front and rear of the cradle.
 - a. Use a long punch to press bushings out by hand.
4. Remove latch per 4.2.7.

4.2.5 Removal of Cradle Assembly from Base Assembly (Figure 2)

Adapter Configuration: STX-2 & STX-2F

1. Remove long (rear) cover per 4.2.2.
2. Position clamp assembly in the open position.
3. Remove (2) guide rail set screws.
 - a. Position adapter upside down on work surface.
 - b. Heat set screws to loosen threadlocker and allow screw removal.
 - c. Use a 1/16" Allen (Hex) wrench.
4. One at a time, slide each guide rail forward far enough to remove springs.
5. Slide (2) guide rails forward and remove them from the adapter assembly.
6. Lift cradle sub assembly from adapter base.
7. Remove (2) guide washers.
8. Remove (4) guide O-rings from disassembled adapter.
9. Remove gear rack.

4.2.6 Disassembly of Cradle Sub Assembly (Figure 7)

Adapter Configuration: STX-2 & STX-2F

1. Remove cradle sub assembly per 4.2.5.
2. Remove (4) Rulon bushings from front and rear of the cradle.
 - a. Use a long punch to press bushings out by hand.
3. Remove latch per 4.2.7.
4. Remove (2) short end cap screws.

- a. Heat set screws to loosen threadlocker and allow screw removal.
- b. Use a 0.050" Allen (Hex) wrench.
5. Remove (2) long end cap screws.
 - a. Heat set screws to loosen threadlocker and allow screw removal.
 - b. Use a 0.050" Allen (Hex) wrench.
6. Remove end cap from cradle
 - a. CAUTION – Slide end cap straight away from the cradle without twisting.
Twisting the end cap can damage the retaining pins.
7. Remove the handpiece retention slide and the slide guide.
8. Remove the slide guide retention and the slide retention pins.

4.2.7 Removal of Latch from Cradle Sub Assembly (Figure 5)

Adapter Configuration: All

1. Remove cradle sub assembly per 4.2.3 or 4.2.5.
2. Position cradle upside down on work surface.
3. Remove (2) latch retaining screws while holding latch down.
 - a. Heat screws to loosen threadlocker and allow screw removal.
 - b. Use a 0.035" Allen (Hex) wrench.
4. Remove latch and dowel pin from cradle.
5. Remove safety and latch spring from cradle.
6. Remove dowel pin from latch.

4.2.8 Removal of Index Ring Lock Sub Assembly (Figure 1)

Adapter Configuration: All

1. Remove (2) guide screws from cradle.
 - a. Heat screws to loosen threadlocker and allow screw removal.
 - b. Use a 1/16" Allen (Hex) wrench.
2. Slide index lock assembly forward to remove from slots in the cradle.

4.2.9 Removal of Index Ring Lock Tabs and Ball Plungers (Figure 6)

Adapter Configuration: All

1. Remove index locking assembly per 4.2.8.
2. Remove (2) lock tab retaining screws and (2) bushings from the lock assembly.
 - a. Heat screws to loosen threadlocker and allow screw removal.
 - b. Use a 0.050" Allen (Hex) wrench.
3. Slide lock tabs out and away from the lock assembly centerline.
4. Remove (2) ball plungers from lock assembly.
 - a. Heat ball plungers to loosen threadlocker and allow their removal.
 - b. Use a small slotted screwdriver that will fit into guide hole.

4.2.10 Removal of Short (Forward) Cover (Figure 1)

Adapter Configuration: All

1. Remove (3) cover screws.
 - a. Use #0 Phillips screwdriver.
2. Remove cover and clean silicone from cradle and cover contact surfaces.

4.2.11 Removal of Release Bar Sub Assembly (Figure 3)

Adapter Configuration: All

1. Remove cradle sub assembly per 4.2.3 or 4.2.5.
2. Remove (2) release bar retaining screws and (2) bushings from adapter base sub assembly.
 - a. Heat screws to loosen threadlocker and allow screw removal.
 - b. Use a 0.050" Allen (Hex) wrench.
3. Lift release bar assembly away from base assembly.
4. Remove (2) release bar springs from base assembly.

4.2.12 Removal of Safety Release Knobs (Figure 4)

Adapter Configuration: All

1. Remove cradle sub assembly per 4.2.3 or 4.2.5.
2. Remove release bar assembly per 4.2.11.
3. Remove (2) retaining screws from release bar.
 - a. Heat screws to loosen threadlocker and allow screw removal.
 - b. Use a 5/64" Allen (Hex) wrench.
4. Pull knobs out and away from the release bar.
5. Remove bushings and safety springs from knobs.

4.2.13 Removal of Lever (Figure 3)

Adapter Configuration: All

1. Remove cradle sub assembly per 4.2.3 or 4.2.5.
2. Remove the retaining screw and threaded hub.
 - a. Heat screw to loosen threadlocker and allow screw removal.
 - b. Hold release bar securely with locking pliers or a small bench vise.
 - c. Use a 5/64" Allen (Hex) wrench.
3. Lift lever and lever hub from base assembly.
4. Lift torsion spring from base assembly.

4.3 Assembly

In this section, the complete assembly of the ATEC Stereotactic Adapter will be covered. The procedure varies based on the adapter configuration. Verify adapter configuration before servicing and use the applicable instructions as noted. The figure numbers listed are for the associated drawings located in Section 5: Drawings and Illustrated Parts List.

NOTE: LOCTITE[®] 242 medium strength threadlocker is applied to all threaded fasteners of the ATEC Stereotactic Adapter. Avoid contact of threadlocker on all moving parts and clean off any excess threadlocker immediately.

4.3.1 Installation of Lever (Figure 3)

Adapter Configuration: All

1. Insert torsion spring into adapter base with the straight leg of the spring into the adapter base.
2. Place lever onto adapter base matching bent leg of torsion spring with the slot on the lever.
3. Insert lever hub into lever.

4. Install lever screw through adapter base and into lever hub. The lever must be oriented as in Figure 3.
 - a. Apply threadlocker onto threads of lever screw.
 - b. Use 5/64" Allen (Hex) wrench.
5. Inspect parts and clean off any excess threadlocker.
6. Ensure that lever can be rotated about the lever screw and that it returns to the stowed position flush with the side of the adapter base. Inspect vertical movement of lever; ensure that a gage pin no greater than 0.075" can be placed between the bottom of the adapter base and the lever when the lever is held at its lowest position. Do not place excessive force on the lever.

4.3.2 Assembly of Release Bar Sub Assembly (Figure 4)

Adapter Configuration: All

1. Insert one safety guide bushing into each safety and latch spring.
2. Insert one safety screw into each safety guide bushing.
3. Insert each assembled safety screw, safety and latch spring and safety guide bushing into each safety release knob.
4. Install assembled safety release knob on release bar. The safety release knob must be oriented as in Figure 4.
 - a. Apply threadlocker onto threads of each safety screw.
 - b. Use 5/64" Allen (Hex) wrench.
5. Inspect parts and clean off any excess threadlocker.
6. Ensure that safety release knobs can be extended and spring back to the retracted position.

4.3.3 Installation of Release Bar Sub Assembly (Figure 3)

Adapter Configuration: All

1. Place (2) release bar springs onto the adapter base.
2. Insert one release bar screw into each release bar bushing.
3. Install release bar sub assembly on the adapter base with (2) release bar screws and (2) release bar bushings. The release bar assembly must be oriented as in Figure 3.
 - a. Apply threadlocker onto threads of each release bar screw.
 - b. Use 0.050" Allen (Hex) wrench.
4. Inspect parts and clean off any excess threadlocker.
5. Ensure that the release bar assembly can be retracted and springs back to the extended position when released.

4.3.4 Installation of Latch (Figure 5)

Adapter Configuration: STX-1 & STX-Fischer

1. Insert dowel pin into hole on the latch.
2. Position cradle upside down on work surface.
3. Insert safety and latch spring and the latch with dowel pin installed into cradle.
4. Install (2) latch screws into cradle while holding latch down.
 - a. Apply threadlocker onto threads of each latch screw.
 - b. Use 0.035" Allen (Hex) wrench.
5. Inspect parts and clean off any excess threadlocker.

6. Ensure that the latch will fully extend and retract. When safety and latch spring is fully compressed, the leading edge of the latch should be flush with the bottom surface of the cradle. When the safety and latch spring is fully extended, the aft edge of the latch should be flush with the bottom surface of the cradle.

4.3.5 Installation of Rulon Bushings (Figure 5)

Adapter Configuration: STX-1 & STX-Fischer

1. Insert one $\frac{1}{4}$ " long Rulon bushing into each hole on latch end of cradle.
 - a. Ensure that Rulon bushing is completely seated into cradle and does not obstruct clamp assembly slide area.
2. Insert one $\frac{1}{2}$ " long Rulon bushing into each hole on index lock assembly end of cradle.
 - a. Ensure that Rulon bushing is completely seated into cradle and is flush with the forward surface of the cradle.

4.3.6 Installation of Spring Plunger (Figure 2)

Adapter Configuration: STX-1 & STX-Fischer

1. Install spring plunger with Delrin plunger facing into the clamp slot on the cradle sub assembly.
 - a. Apply threadlocker onto threads of the spring plunger body.
 - b. Use 0.019" pin gage or feeler stock to ensure that there is a 0.019" gap between tip of the Delrin plunger and rear wall of clamp slot on the cradle sub assembly.
 - c. Use needle nose Vise (locking) pliers to install and adjust depth.

4.3.7 Installation of Short (forward) Cover (Figure 1)

Adapter Configuration: STX-1 & STX-Fischer

1. Apply a small bead of silicone sealant to the cradle contact surface of the short cover.
2. Place short cover on ring lock assembly end of the cradle.
3. Install (3) cover screws through the cover to the cradle.
 - a. Apply threadlocker onto threads of each cover screw.
 - b. Use #0 Phillips screwdriver.
4. Inspect parts, clean off any excess threadlocker and silicone.

4.3.8 Assembly of Cradle and Base Sub Assemblies (Figure 2)

Adapter Configuration: STX-1 & STX-Fischer

1. Place gear rack into slot on adapter base sub assembly.
 - a. Apply a thin film of PTFE lubricant to the upper and lower surfaces of the gear rack.
 - b. Place gear rack as far forward in the slot as possible with the lever in the stowed position.
 - c. Verify that the lever will travel approximately 80 degrees from the stowed to the cocked position and spring back to the stowed position.
2. Install guide rails into base sub assembly.
 - a. Insert (2) guide rails approximately $\frac{1}{2}$ " into forward end of the base sub assembly with the grooved ends facing the rear of the adapter.

- b. Insert (2) guide O-rings onto each guide rail.
3. Place cradle sub assembly onto adapter assembly.
 - a. Ensure that the slot on the bottom of the cradle fits over the gear rack.
 - b. Cradle must be oriented as seen in Figure 2.
4. Slide (2) guide rails into cradle sub assembly while holding cradle in the forward position against guide O-rings. Guide rails should be inserted until the grooved end of the rail can be seen in the clamp assembly slot on the cradle and then pulled back until the rails no longer block the clamp slot.
5. Install clamp assembly.
 - a. Verify proper adjustment of the spring plunger per 4.3.8.
 - b. Place clamp assembly into the slot on the cradle by positioning it so that the spring plunger engages the cutout in the clamp. The clamp assembly must be oriented as in Figure 2.
 - c. Slide (2) guide rails aft until they protrude out of the cradle approximately $\frac{1}{4}$ ".
6. Install (2) guide washers and (2) firing springs.
 - a. Place one guide washer on each guide rail.
 - b. One at a time, install one firing spring on each protruding guide rail and push guide rail aft until it is flush with both the front and aft faces of the adapter base.
7. Install (2) guide socket set screws.
 - a. Place adapter upside down on the work surface.
 - b. Apply threadlocker on the threads of the guide socket set screws.
 - c. Use 1/16" Allen (Hex) wrench.
 - d. Ensure that both guide rails are retained once guide socket set screws have been tightened by pushing on the guide rails.
8. Ensure proper operation of the assembled adapter per section 4.4.

4.3.9 Assembly of Cradle Sub Assembly (Figure 7)

Adapter Configuration: STX-2 & STX-2F

1. Insert slide guide retention pin into cradle and press until fully seated.
2. Insert slide retention pin into cradle and press until fully seated.
3. Insert slide guide into slot on the rear of the cradle with the looped end over the slide guide retention pin.
4. Insert handpiece retention slide into slide guide in the cradle.
5. Install the cradle end cap on the cradle.
 - a. Start the end cap installation at the cutout in the end cap channel and slide into position. Use caution not to damage the slide guide material.
6. Install (2) long cap screws and (2) short cap screws.
 - a. Apply threadlocker onto threads of each release bar screw.
 - b. Use 0.050" Allen (Hex) wrench.
7. Verify that the handpiece retention slide moves smoothly without binding.
 - a. May require handpiece to be inserted so that the handpiece retention slide maintains the proper arc during movement.

4.3.10 Installation of Rulon Bushings (Figure 7)

Adapter Configuration: STX-2 & STX-2F

1. Insert one SR3120-01 Rulon bushing into each hole on the end cap end (rear) of the cradle.
 - a. Ensure that bushing is completely seated into cradle and clean any excess material from the bushing face.
2. Insert one SR3018-02 Rulon bushing into each hole on index lock assembly end (front) of cradle.
 - a. Ensure that bushing is completely seated into cradle and is flush with the forward surface of the cradle.
3. Slide a guide rail through each of the bushings to verify that the rail slides smoothly with no binding or excess friction.

4.3.11 Installation of Latch (Figure 5)

Adapter Configuration: STX-2 & STX-2F

1. Insert dowel pin into hole on the latch.
2. Position cradle upside down on work surface.
3. Insert safety and latch spring into detent on the cradle.
4. Place the latch with dowel pin installed into cradle.
5. Install (2) latch screws into cradle while holding latch down.
 - a. Apply threadlocker onto threads of each latch screw.
 - b. Use 0.035" Allen (Hex) wrench.
6. Inspect parts and clean off any excess threadlocker.
7. Ensure that the latch will fully extend and retract. When safety and latch spring is fully compressed, the front of the latch should be flush with the bottom surface of the cradle. When the safety and latch spring is fully extended, the rear edge of the latch should be flush with the bottom surface of the end cap.

4.3.12 Installation of Short (forward) Cover (Figure 1)

Adapter Configuration: STX-2 & STX-2F

1. Apply a small bead of silicone sealant to the cradle mating surface of the short cover.
2. Place short cover on ring lock assembly end of the cradle.
3. Install (3) cover screws through the cover to the cradle.
 - a. Apply threadlocker onto threads of each cover screw.
 - b. Use #0 Phillips screwdriver.
4. Inspect parts, clean off any excess threadlocker and silicone.

4.3.13 Assembly of Cradle and Base Sub Assemblies (Figure 2)

Adapter Configuration: STX-2 & STX-2F

1. Place gear rack into slot on adapter base sub assembly.
 - a. Apply a thin film of PTFE lubricant to the upper and lower surfaces of the gear rack.
 - b. Place gear rack as far forward in the slot as possible with the lever in the stowed position.
 - c. Verify that the lever will travel approximately 80 degrees from the stowed to the cocked position and spring back to the stowed position.
2. Install guide rails into base sub assembly.

- a. Insert (2) guide rails approximately $\frac{1}{2}$ " into forward end of the base sub assembly with the grooved ends facing the rear of the adapter.
- b. Insert (2) guide O-rings onto each guide rail.
3. Place cradle sub assembly onto adapter assembly.
 - a. Ensure that the slot on the bottom of the cradle fits over the gear rack.
 - b. Cradle must be oriented as seen in Figure 2.
4. Slide (2) guide rails into cradle sub assembly while holding cradle in the forward position against guide O-rings. Guide rails should be inserted until the grooved end of the rails protrudes from the aft end of the cradle approximately $\frac{1}{4}$ ".
5. Install (2) guide washers and (2) firing springs.
 - a. Place one guide washer on each guide rail.
 - b. One at a time, install one firing spring on each protruding guide rail and push guide rail aft until it is flush with both the front and aft faces of the adapter base.
6. Install (2) guide socket set screws.
 - a. Place adapter upside down on the work surface. CAUTION – Protect the handpiece retention slide from damage.
 - b. Apply threadlocker on the threads of the guide socket set screws.
 - c. Use 1/16" Allen (Hex) wrench.
 - d. Ensure that both guide rails are retained once guide socket set screws have been tightened by pushing on the guide rails.
7. Ensure proper operation of the assembled adapter per section 4.4.

4.3.14 Assembly of Index Lock Sub Assembly (Figure 6)

Adapter Configuration: All

1. Install (2) ball plungers into guide.
 - a. Apply threadlocker onto the guide threads for the (2) ball plungers. Clean any excess threadlocker from the top surface of the guide prior to continuing.
 - b. One at a time, place ball plungers on top side of the guide with ball end facing up.
 - c. Use slotted screwdriver to back down ball plungers until the ball is even or slightly above the top surface of guide.
2. Insert left index ring lock and right index ring lock into guide. See Figure 6 for positioning of ring locks.
3. Insert one index ring lock screw into each index ring lock bushing.
4. Install index ring lock screws and index ring lock bushings through index ring locks and into the guide.
 - a. Apply threadlocker onto threads of the index ring lock screws.
 - b. Use 0.050" Allen (Hex) wrench.
5. Advance (2) ball plungers until the index ring locks can not be advanced or retracted. Then back both ball plungers out approximately $\frac{1}{4}$ turn.
 - a. Use slotted screwdriver
6. Inspect parts and clean off any excess threadlocker.
7. Ensure that both index ring locks can be extended and retracted and that the index lock detents can be felt.

4.3.15 Installation of Index Ring Lock Sub Assembly (Figure 1)

Adapter Configuration: All

1. Insert index lock assembly into slots on cradle.
2. Install (2) guide screws through the index lock assembly to the cradle.
 - a. Apply threadlocker onto threads of (2) guide screws.
 - b. Use 1/16" Allen (Hex) wrench.
3. Inspect parts and clean off any excess threadlocker.

4.3.16 Installation of Rear (Long) Cover (Figure 1)

Adapter Configuration: All

1. Apply a small bead of silicone sealant to the cradle contact surface of the cover.
2. Place cover on aft end of the cradle.
3. Install (3) cover screws through the cover to the cradle.
 - c. Apply threadlocker onto threads of each cover screw.
 - d. Use #0 Phillips screwdriver.
4. Inspect parts, clean off any excess threadlocker and silicone.
5. Install Cleaning Label.

4.3.17 Assembly and Installation of Fischer Bracket (Figure 8)

Adapter Configuration: STX-Fischer & STX-2F

1. Apply threadlocker to the threads of the Fischer bracket thumbwheel socket. Clean any excess threadlocker from the clamp slot in the bracket.
2. Slide insert clamp into slot in bracket.
3. Slide thumbwheel into slot in insert clamp.
4. Install thumbwheel socket set screw while holding the thumbwheel stationary.
 - a. Use a 1/8" Allen (Hex) wrench.
5. Ensure that the insert clamp moves up and down when turning thumbwheel and that the thumbwheel socket set screw does not move.
6. Install Fischer bracket to the adapter assembly.
 - a. Bracket must be installed as shown in Figure 8. The thumbwheel must face aft and the forward alignment mark must match the alignment mark on the bottom of the adapter base.
 - b. Use a 3/16" Allen (Hex) wrench.

4.4 Operational Check of Assembled Adapter

This operational check will test all normal functions of the components of an assembled and serviceable ATEC Stereotactic Adapter. Accomplish operational checks using the checklist in Appendix 2.

4.5 Troubleshooting

This section will provide troubleshooting assistance should you have problems operating the ATEC Stereotactic Adapter. Please consult the following information before contacting the manufacturer to verify reported errors. If, after reading this section, the problem still cannot be resolved, please contact Suros Customer Service for technical support.

Issues Encountered

Problem	Possible Cause	Possible Remedy
Adapter will not lock in the cocked position.	1 Corrosion/contaminant in latch assembly. 2 Corrosion/contaminant in release bar assembly. 3 Worn latch, release bar and/or cradle Rulon bushings.	1a Clean adapter assembly thoroughly. 1b Remove latch and clean thoroughly. 2a Clean adapter assembly thoroughly. 2b Remove release bar assembly. Clean thoroughly. 3 Remove parts, check for wear. Replace as needed.
Adapter fires without pulling out the safety/firing knobs.	1 Corrosion/contaminant in latch assembly. 2 Corrosion/contaminant in release bar assembly. 3 Safety knobs not fully seated. 4 Worn latch, release bar and/or cradle Rulon bushings.	1a Clean adapter assembly thoroughly. 1b Remove latch and clean thoroughly. 2a Clean adapter assembly thoroughly. 2b Remove release bar assembly. Clean thoroughly. 3a Corrosion in assembly, clean thoroughly. 3b Remove safety knobs and clean thoroughly. 4 Remove parts, check for wear. Replace as needed.
Adapter cocks but will not fire.	1 Front cover is bent. 2 Corrosion/contaminant on guide rails. 3 Corrosion/contaminant in release bar assembly.	1 Replace cover. 2 Remove the guide rails and clean thoroughly. 3a Clean adapter assembly thoroughly. 3b Remove release bar assembly. Clean thoroughly.
Adapter is difficult to cock.	1 Corrosion/contaminant between the cocking lever and the adapter base. 2 Corrosion/contaminant on guide rails. 3 Front and/or rear cover(s) are bent causing interference between cradle and base assembly.	1a Clean adapter assembly thoroughly. 1b Remove lever and clean thoroughly. 2 Remove the guide rails and clean thoroughly. 3 Replace damaged cover(s) as needed.
Adapter does not fire with enough force.	1 Corroded guide rails. 2 Weak firing springs. 3 Bent/dragging front or rear cover.	1 Remove and clean guide rails thoroughly. 2 Replace firing springs. 3 Replace damaged cover.
Clamp does not hold handpiece properly. Configuration: STX-1 & STX-Fischer	1 Worn or out of adjustment spring plunger.	1 Replace spring plunger and adjust.

Problem	Possible Cause	Possible Remedy
Slide does not hold handpiece properly, unlatches easily. Configuration: STX-2 & STX-2F	1 Bent handpiece retention slide.	1 Replace handpiece retention slide.
Slide difficult to unlatch or handpiece will not rotate with the clamp locked. Configuration: STX-2 & STX-2F	1 Bent handpiece retention slide.	1 Replace handpiece retention slide.
Slide binding when moved between locked and un-locked positions. Configuration: STX-2 & STX-2F	1 Corrosion/contaminant in slide channel. 2 Bent handpiece retention slide.	1 Remove end cap and clean slide channel. 2 Replace handpiece retention slide.
Index locking tabs are hard to move.	1 Corrosion/contaminant in bushing and ball plunger area. 2 Bent tabs on index guide.	1 Clean index ring lock assembly thoroughly. 2 Replace index ring lock guide.
Index locking tabs do not hold the hub securely.	1 Ball plungers out of adjustment. 2 Bent tabs on index guide.	1 Adjust ball plungers. 2 Replace index ring lock guide.
There is evidence of corrosion on the release bar assembly.	1 Release bar does not have the Nicotef protective coating. 2 The adapter has not been properly cleaned.	1 Replace release bar with latest revision part. 2 Remove release bar assembly and clean corrosion using a Scotch Bright® pad. Use caution not to remove protective coating from release bar.
Fischer adapter/bracket slides/moves on the guide rail when fired.	1 Unit not properly secured to guide rail. a. Old revision thumbwheel. b. New revision thumbwheel. 2 Worn Fischer bracket clamp.	1a Old revision thumbwheel has a smooth and rounded surface that makes it difficult to secure. Thumbwheel should be replaced with new revision star thumbwheel. 1b Adapter not secured properly. Review tightening procedure with technologist to verify proper procedure. 2 Replace bracket clamp.
Finish of adapter has become rough and faded.	1 Adapter is not being cleaned in accordance with recommended procedures or with proper cleaning agent.	1 Clean surface corrosion using a Scotch Bright® pad. Use caution not to remove protective anodized coating.

SECTION 5: DRAWINGS AND ILLUSTRATED PARTS LIST

5.1 Drawings and Illustrated Parts List

The following drawings and part numbers should be used to assist in the assembly and disassembly of the adapter, as well as for ordering replacement parts. Contact Suros Customer Service at 877-887-8767 to place all parts orders.

Any missing part numbers are not available for purchase at this time. If replacement of a non-listed part is required, please contact Suros Customer Service for technical support. Your ATEC Stereotactic Adapter and its components should not be modified in anyway.

All instructions for removal and installation of adapter components should be followed in order to ensure the proper function of your ATEC Stereotactic Adapter.

BOM#	QTY	Part No.	Description
1	2	SR3010-01	Screw, Guide
2	1	SR3043-01	Cover, Short
3	1	SR3044-01	Cover, Long
4	6	SR3045-01	Screw, Cover
5	<1	SR3067-01	Silicone Sealant
6	1	SR3068-01	Label, Serial Number
7	1	SR3073-01	Label, Cleaning
8	1	SR3080-01	Index Ring Lock Assembly

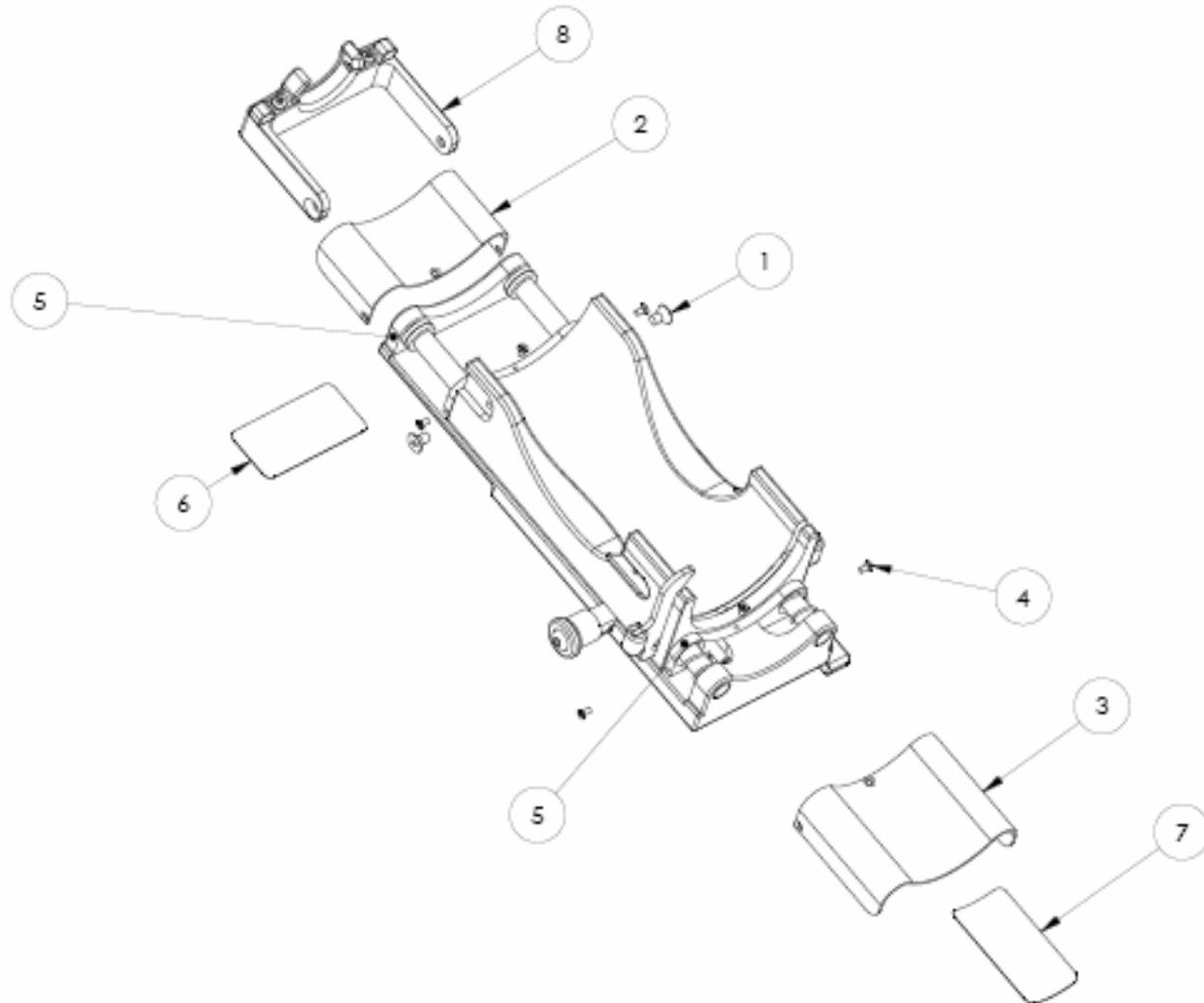


Figure 1

BOM#	QTY	Part No.	Description
1	2	SR3038-01	Shaft, Guide
2	2	SR3040-01	Washer, Guide
3	2	SR3041-01	Spring, Guide
4	4	SR3039-01	O-Ring, Guide
5	1	SR3074-01	Spring Plunger
6	2	SR3042-01	Socket Set Screw, Guide
7	1	SR3079-01	Clamp Assembly
8	1	SR3003-01	Adapter Base
9	1	SR3004-01	Cradle

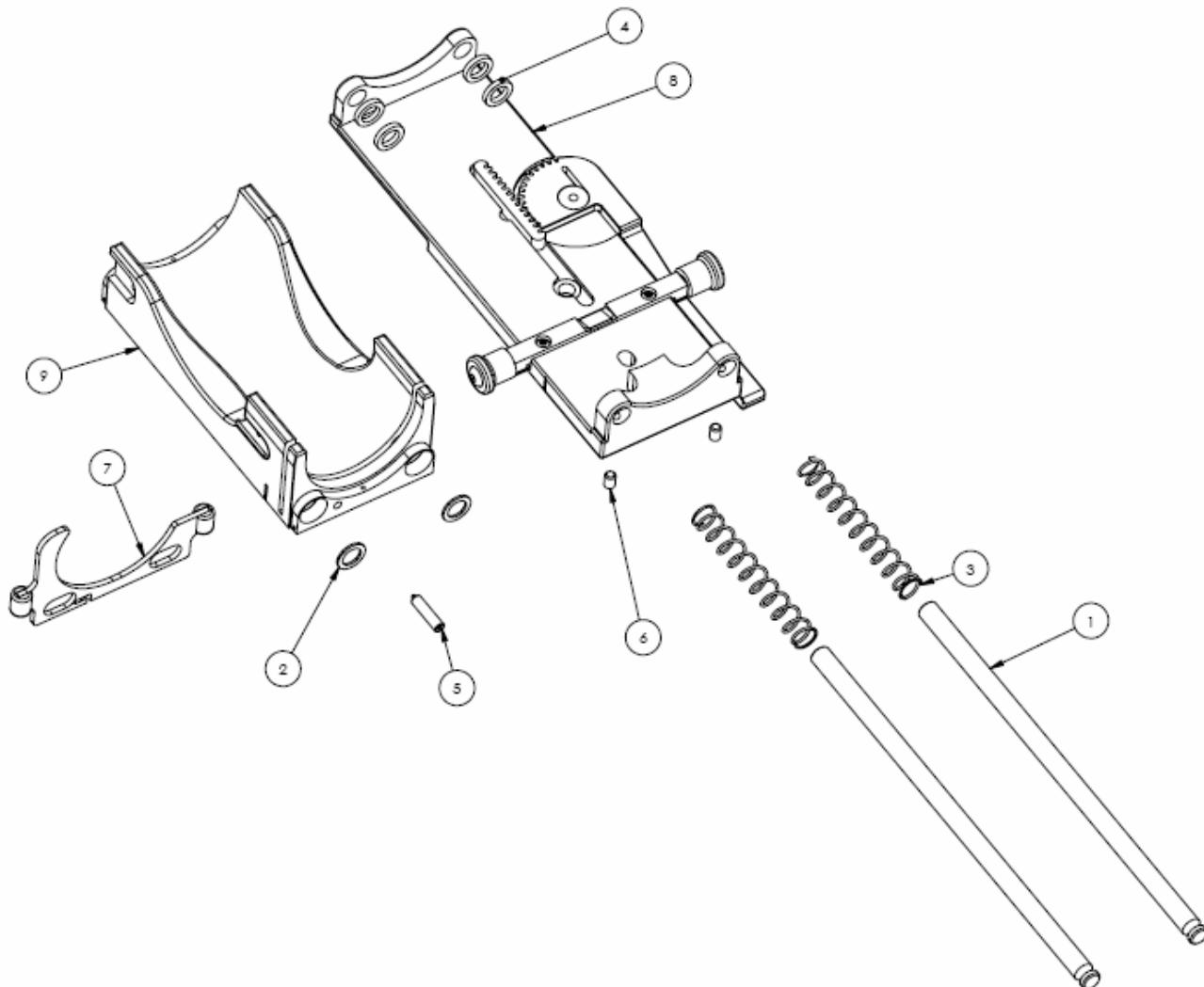


Figure 2

BOM#	QTY	Part No.	Description
1	1	SR3003-01	Adapter Base
2	1	SR3037-01	Insert, Threaded
3	1	SR3020-01	Lever
4	1	SR3021-01	Hub, Lever
5	1	SR3022-01	Torsion Spring, Lever
6	1	SR3023-01	Screw, Lever
7	1	SR3019-01	Gear Rack
8	2	SR3026-01	Spring, Release Bar
9	2	SR3025-01	Bushing, Release Bar
10	2	SR3027-01	Screw, Release Bar
11	1	SR3076-01	Release Bar Assembly

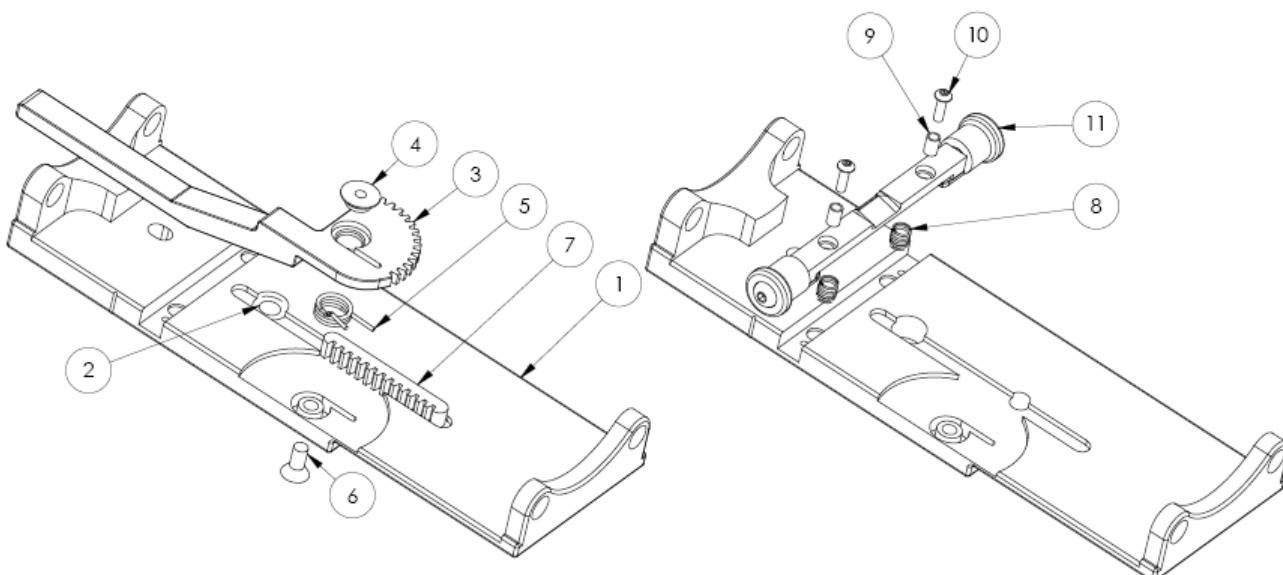


Figure 3

BOM#	QTY	Part No.	Description
1	1	SR3024-01	Release Bar
2	2	SR3028-01	Knob, Safety Release
3	2	SR3030-01	Spring, Safety and Latch
4	2	SR3031-01	Screw, Safety
5	2	SR3029-01	Bushing, Safety Guide

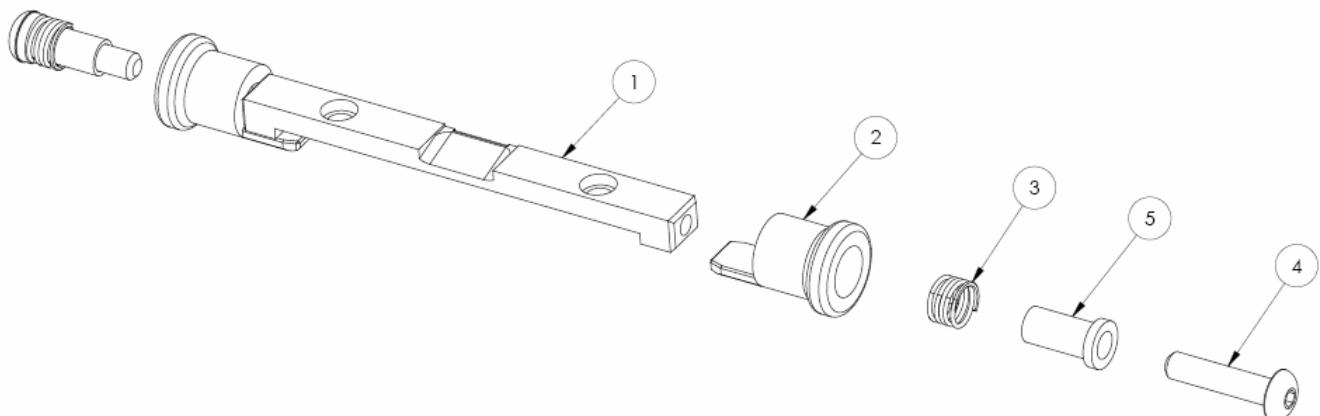


Figure 4

BOM#	QTY	Part No.	Description
1	1	SR3004-01	Cradle
2	2	SR3018-01	Rulon Bushing, 1/4"
3	2	SR3018-02	Rulon Bushing, 1/2"
4	1	SR3032-01	Latch
5	1	SR3034-01	Dowel, Pin
6	1	SR3030-01	Spring, Safety and Latch
7	2	SR3036-01	Screw, Latch

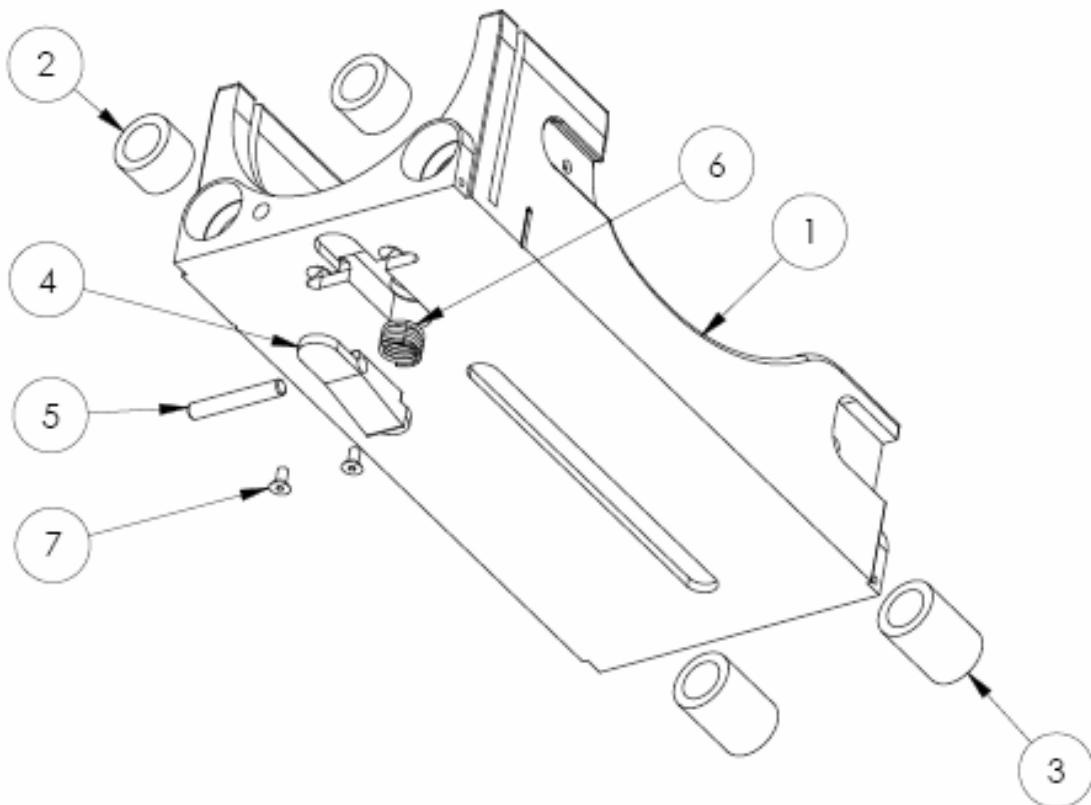


Figure 5

BOM#	QTY	Part No.	Description
1	1	SR3005-01	Guide, Index Ring Lock
2	1	SR3007-01	Index Ring Lock, Left
3	1	SR3007-02	Index Ring Lock, Right
4	2	SR3008-01	Bushing, Index Ring Lock
5	2	SR3006-01	Screw, Index Ring Lock
6	2	SR3013-01	Ball Plunger, Index Ring Lock & Upright Retainer

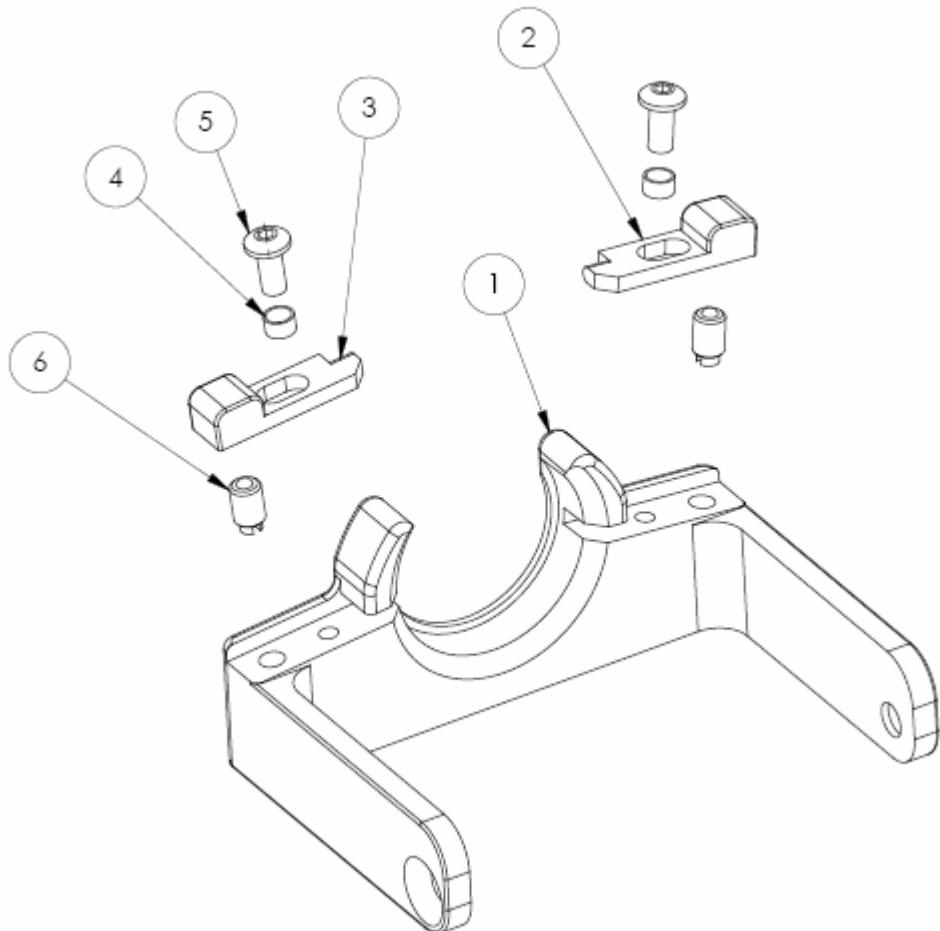


Figure 6

BOM#	QTY	Part No.	Description
1	1	SR3098-01	Cradle
2	1	SR3099-01	End Cap
3	1	SR3100-01	Slide Guide, Handpiece Retaining
4	1	SR3103-01	Pin, Slide Retention
5	2	SR3102-01	Bushing, End Cap
6	2	SR3105-01	Screw, End Cap Short
7	2	SR3106-01	Screw, End Cap Long
8	1	SR3104-01	Pin, Slide Guide Retention
9	1	SR3101-01	Slide, Handpiece Retention
10	2	SR3018-02	Rulon Bushing, 1/2"

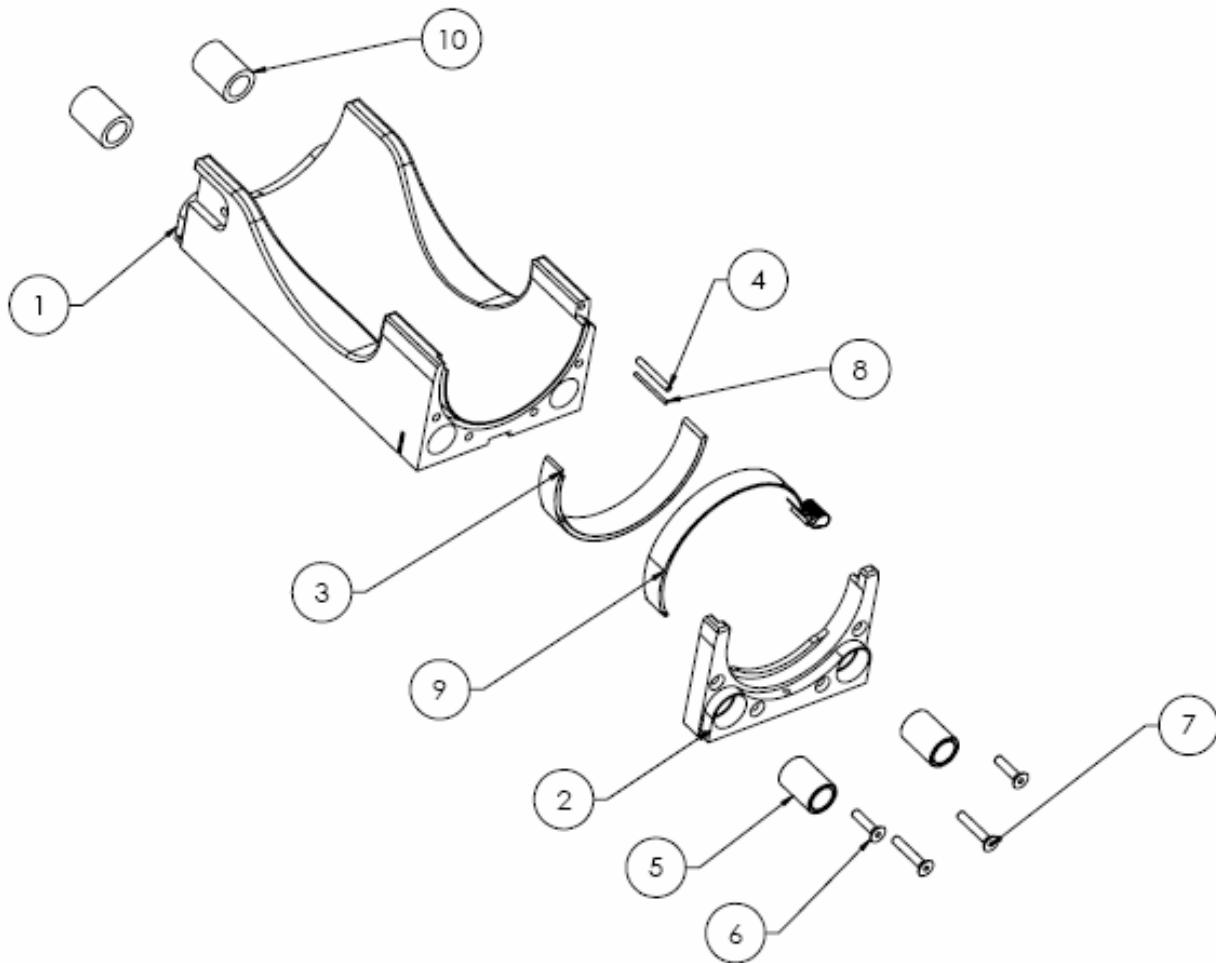


Figure 7

BOM#	QTY	Part No.	Description
1	1	SR3000-01	Adapter, LORAD Prone Stereotactic
2	1	SR3051-01	Screw, Fischer Bracket Adapter
3	1	SR3002-01	Fischer Bracket Assembly
4	1	SR3060-01	Fischer Needle Guide Holder Assembly
5	1	SR3046-01	Bracket, Fischer
6	1	SR3047-01	Thumbwheel
7	1	SR3048-01	Fischer Bracket
8	1	SR3049-01	Socket Set Screw, Thumbwheel

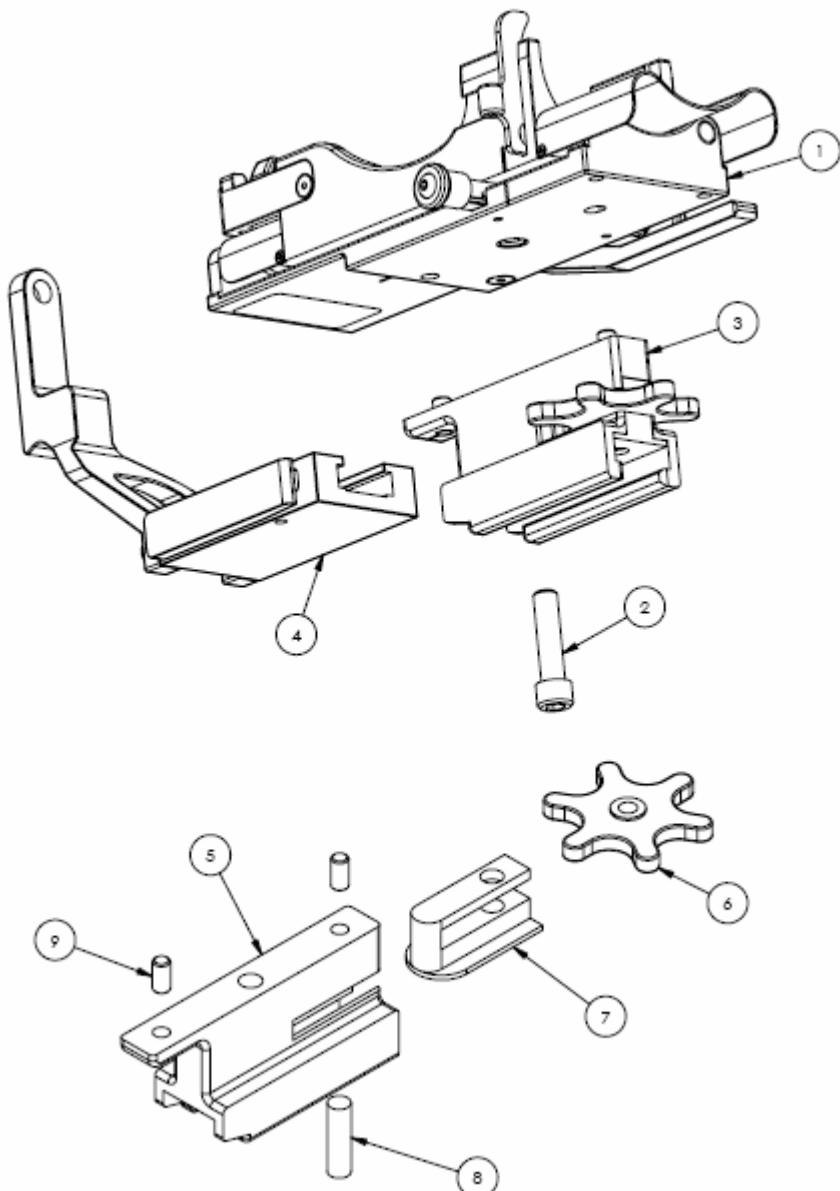


Figure 8

Appendix 1: Preventive Maintenance Checklist

- Clean adapter per pre-service cleaning instructions section 3.2.2.
- Perform general inspection of adapter per section 3.3; note any components that require replacement or repair.
- Remove cradle assembly per section 4.2.3 - **STX-1 and STX-Fischer.**
 - Discard firing springs and O-rings.
 - Remove and discard the spring plunger per section 4.2.4.
 - Clean and check Rulon bushings on cradle for damage.
- Remove cradle assembly per section 4.2.5 - **STX-2 and STX-2F.**
 - Discard firing springs and O-rings.
 - Clean and check Rulon bushings on cradle for damage.
- Remove release bar assembly per section 4.2.11.
 - Discard release bar springs.
- Remove index locking tabs per section 4.2.9 – DO NOT remove the ball plungers at this time.
- Discard any damaged bushings or components and obtain replacement if not included in the PM kit.
- Check cocking lever for security and function per 4.3.1.
 - Remove lever and replace faulty components only if it does not function properly.
- Check release bar and safety release knobs for corrosion and clean as needed.
- Check function of safety release knobs per section 4.3.2.
 - If safety release knobs are removed, replace safety and latch springs.
- Check index lock assembly ball plungers for freedom of movement of the ball.
 - Replace and adjust ball plungers only as needed per section 4.3.14.
- Check latch for corrosion and proper operation per section 4.3.4 - **STX-1 and STX-Fischer.**
 - If latch is removed, replace safety and latch spring and latch screws.
- Check latch for corrosion and proper operation per section 4.3.11 - **STX-2 and STX-2F.**
 - If latch is removed, replace safety and latch spring and latch screws.
- Replace and adjust spring plunger per section 4.3.6 - **STX-1 and STX-Fischer.**
- Inspect all remaining parts for corrosion and damage; clean or replace as needed.
- Replace all discarded parts with parts from the PM kit.
- Re-assemble adapter using proper instructions from section 4.3.
 - Check all threaded fasteners for security.
- Perform operational check of adapter per section 4.4 and Appendix 2.

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Appendix 2: Operational Check of Assembled Adapter

➤ Hold adapter firmly to prevent accidentally dropping during operational tests.

- Check function of cocking lever.
 - Cock adapter by rotating lever forward.
 - Lever should rotate approximately 80° from the stowed position.
 - Lever should move freely without excessive force.
 - When released, the lever should return to the stowed position against the adapter base.
 - The cradle should lock in the cocked (pre-fired) position.
 - The lever should move freely with the cradle locked in the cocked position.
- Check function of safety release knobs.
 - Cock adapter prior to check.
 - One at a time, push down on the safety release knobs without pulling them out of the locked/stowed position.
 - The adapter should remain in the cocked position.
 - One at a time, pull out on the safety release knobs without pushing down on the release bar.
 - The adapter should remain in the cocked position.
- Check function of release bar and latch.
 - Cock adapter prior to check.
 - Pull out on one of the safety release knobs and press down on the release bar.
 - The cradle should fire forward forcefully and rapidly.
 - The cradle should travel approximately 20mm.
 - Check clearance on both the front and rear covers.
 - Repeat process with other safety release knob and as many times as required in order to verify proper function of the adapter.
- Check function of index ring lock tabs.
 - Slide each tab between the locked and unlocked position.
 - The detents in the tabs should be felt engaging the ball plungers in each position.
 - The tabs should not require excessive force to be moved from each position.
- Check function of handpiece retaining clamp - **STX-1 and STX-Fischer**.
 - Check that the clamp engages the detents in both the open and closed position.
 - The clamp should not require excessive force to be moved from the open and closed positions.
- Check function of handpiece retention slide - **STX-2 and STX-2F**.
 - Place a handpiece in the adapter.
 - Verify the slide moves smoothly between the open and locked positions.
 - Verify the handpiece rotates smoothly with the slide locked.